

ii0 Faraday's Researches

platina, if they were made to replace the water, *i.e.* if the view of independent action which I have taken (362, 363), as a consequence of Dalton's principles, be correct. It would also seem that the mutual relation of similar particles, and the indifference of dissimilar particles which Dalton has established as a matter of fact amongst gases and vapours, extends to a certain degree amongst solids and fluids, that is, when they are in relation by contact with vapours, either of their own substance or of other bodies. But though I view these points as of great importance with respect to the relations existing between different substances and their physical constitution in the solid, liquid, or gaseous state, I have not sufficiently considered them to venture any strong opinions or statements here.¹

394. There are numerous well-known cases, in which substances, such, as oxygen and hydrogen, act readily in their *nascent* state, and produce chemical changes which they are not able to effect if once they have assumed the gaseous condition. Such instances are very common at the poles of the voltaic pile, and are, I think, easily accounted for, if it be considered that at the moment of separation of any such particle it is entirely surrounded by other particles of a *different* kind with which it is in close contact, and has not yet assumed those relations and conditions which it has in its fully developed state, and which it can only assume by association with other particles of its own kind. For, at the moment, its elasticity is absent, and it is in the same relation to particles with which it is in contact, and for which it has an affinity, as the particles of oxygen and hydrogen are to each other on the surface of clean platina (3², 363).

395. The singular effects of retardation produced by very small quantities of some gases, and not by large quantities of others (376, 381, 388), if dependent upon any relation of the added gas to the surface of the solid, will then probably be found immediately connected with the curious phenomena which are presented by different gases when passing through narrow tubes at low pressures, which I observed many years ago;² and this action of surfaces must, I think, influence the highly interesting

phenomena of the diffusion of gases, at least in the form in which it has been experimented upon by Mr. Graham in 1829 and

¹ In reference to this paragraph and also 362, see a correction by Dr. C. Henry, in his valuable paper on this curious subject—*Philosophical Magazine*, 1835, vol. vi. p. 365.—December 1838.

² *Quarterly Journal of Science*, 1819, vol. vii. p. 106.